# Document details



International Journal of Recent Technology and Engineering
Volume 7, Issue 6, March 2019, Pages 113-118

## The effect of hydraulic damper characteristics on the ride and handling of ground vehicle (Article)

Rusli, F.Z., Darsivan, F.J.

Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Malaysia

### Abstract

View references (8)

In this paper, ride quality and handling performance of a vehicle are quantified by the vibration transmitted to the vehicle's body. A passive suspension is designed to compromise between a good ride comfort and a good handling performance. In the development of modern passenger vehicle, subjective testing is greatly involved. In this study, a quantitative method is used to determine the range of suspension parameter for acceleration, braking, ride comfort and handling performances. The investigation involved a full car model with 7 degrees of freedom and VeDyna software was utilized to simulate the performance of the vehicle when subjected to different road profiles and different handling maneuver. The effect of 3 different nonlinear suspension characteristics towards the ride and handling was investigated. The results show that small damping ratio compromise the vehicle dynamic performance, and high damping ratio gives magnification of vibration to the vehicle. This study shows that by changing the suspension characteristics can greatly affect the comfort of the driver and the performance of the vehicle © BEIESP.

### Author keywords

Ground vehicle | Handling Performance | Non-linear shock absorber | Ride Quality

### Funding details

| Funding sponsor | Funding number | Acronym |
|---|---|---|
| Ministry of Higher Education, Malaysia | RIGS17-057-0632 | |
| International Islamic University Malaysia | | |
| Faculty of Engineering, Alexandria University | | |

Funding text

The authors acknowledge the financial support of the Ministry of Education Malaysia under research grant RIGS17-057-0632 and the Faculty of Engineering, International Islamic University Ma-laysia for providing the necessary facilities. We would like to thank Dr. Marita Irmscher of TESIS GmbH who has kindly providing us with the support. Our gratitude also goes PROTON Bhd. who has helped in conducting the shock absorber characterization.

**ISSN:** 22773878
**Source Type:** Journal
**Original language:** English
**Document Type:** Article
**Publisher:** Blue Eyes Intelligence Engineering and Sciences Publication

1 Gillespie Thomas, D.
(1992) *Fundamentals of Vehicle Dynamics*, pp. 195-236. Cited 2546 times.
Warrendale, PA: Society of Automotive Engineers."

2 Aly, A.A., Salem, F.A.
Vehicle suspension systems control: A review.
(2013) *International Journal of Control, Automation and Systems 2, No*, 2 (2013), pp. 46-54. Cited 31 times.

3 Patole, S.S., Sawant, S.H.
Theoretical and Numerical Analysis of Half Car Vehicle Dynamic Model Subjected to Different Road Profiles with Wheel Base Delay and Nonlinear Parameters.
(2015) *Int. J. of Multidisciplinary and Current Research*, 3, pp. 542-546. Cited 2 times.

4 Mitra, A.C., Desai, G.J., Patwardhan, S.R., Shirke, P.H., Kurne, W.M.H., Banerjee, N.
Optimization of Passive Vehicle Suspension System by Genetic Algorithm (Open Access)
(2016) *Procedia Engineering*, 144, pp. 1158-1166. Cited 15 times.
http://www.sciencedirect.com.ezproxy.um.edu.my/science/journal/18777058
doi: 10.1016/j.proeng.2016.05.087
View at Publisher

5 Els, P.S., Theron, N.J., Uys, P.E., Thoresson, M.J.
The ride comfort vs. handling compromise for off-road vehicles
(2007) *Journal of Terramechanics*, 44 (4), pp. 303-317. Cited 91 times.
doi: 10.1016/j.jterra.2007.05.001
View at Publisher

6 Dixon John, C.
(2008) *The Shock Absorber Handbook*. Cited 205 times.

7 Azman, M., Rahnejat, H., King, P.D., Gordon, T.J.
Influence of anti-dive and anti-squat geometry in combined vehicle bounce and pitch dynamics
(2004) *Proceedings of the Institution of Mechanical Engineers, Part K: Journal of Multi-body Dynamics*, 218 (4), pp. 231-242. Cited 13 times.
doi: 10.1243/1464419043541464
View at Publisher

8 (2004) *Status Report*, 39 (3).
https://www.iihs.org/iihs/sr/statusreport/article/39/3/3

Darsivan, F.J.; Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Malaysia; email:fjd@iium.edu.my